

REMARKS

Rejections Under 35 USC §102(e)

Claims 1, 2, 5-12, 17, 18, 25-27 and 31-32 have been rejected under 35 USC §102(e) as being anticipated by Fjelstad et al. (US Patent No. 5,802,699).

Summary of the Invention

Independent claims 1, 6 and 12 are directed to an interconnect 10 (Figure 1) for testing a semiconductor component 18 (Figure 3B) having a bumped contact 16 (Figure 3B). As shown in Figures 3A and 3B, the interconnect 10 includes a substrate 12B, and a contact 14B on the substrate 12B for electrically engaging the bumped contact 16. The contact 14B includes a recess 20B in the substrate 12B, and a plurality of leads 22B cantilevered over the recess 20B configured to electrically engage the bumped contact 16. As shown in Figure 3B, the leads 22B can have a shape that matches a topography of the bumped contact 16. In addition, the leads 22B can include projections 28B for penetrating the bumped contact 16. As shown in Figure 3D, the leads 22B can also include an outer layer 46B formed of a material that is non-bonding relative to the bumped contact 16.

As shown in Figure 3A, the contact 14B also includes a conductive connecting segment 40B on the substrate 12B, which electrically connects the leads 22B to one another. As also shown in Figure 3A, the connecting segment 40B can encircle a periphery of the recess 20B. As shown in Figure 3C, the interconnect 10 can also include conductive vias 42B and a contact pad 38B formed on a backside of the substrate 12B in electrical communication with the connecting segment 40B. The conductive via 42B and the

contact pad 38B provide a conductive path from test circuitry to the contact 14B.

Independent claim 25 is directed to a test system 100 (Figure 9A) that includes a die level interconnect 10A. The test system 100 includes a carrier 80 configured to retain the component 18A, which can comprise a singulated die or package. The test system 100 also includes test circuitry 98 configured to apply test signals through the interconnect 10A to the component 18A.

Independent claim 31 is directed to a test system 100W (Figure 10) that includes a wafer level interconnect 10W. The test system 100W includes a test apparatus 96W, such as a wafer prober, having spring loaded electrical connectors 104 configured to electrically engage the contact pads 38W on the interconnect 10W. The test system 100W also includes test circuitry 98 configured to apply test signals through the interconnect 10W to the wafer 102.

Argument

Each of the independent claims has been amended to include a combination of features that is not suggested by Fjelstad et al., making all of the claims both novel and unobvious over Fjelstad et al.

Amended independent claim 1 recites "each metal lead comprising an outer layer selected to provide a non-bonding surface for the bumped contact." Antecedent basis for this recitation is provided on page 13, lines 27-29 of the specification. Fjelstad et al. teaches at column 5, lines 2-5 that the contacts may include a heat-activable bonding material. In addition, Fjelstad et al. teaches at column 6, lines 36-44, the step of bonding the contacts to the

bump leads. Fjelstad et al. thus does not teach a non-bonding surface, but rather teaches away from this feature.

Amended independent claim 2 recites "each lead comprising a conductive polymer outer layer." Antecedent basis for this recitation is provided on page 13, lines 32-34 of the specification. Fjelstad et al. does not teach this material for the contacts.

Amended independent claim 6 recites "an outer layer selected to provide a non-bonding surface for the bumped contact." As with claim 1, Fjelstad et al. does not teach a non-bonding surface, but rather teaches away from this feature.

Amended independent claim 8 recites "each lead comprising an outer layer comprising a conductive polymer", and is allowable for the essentially the same reasons as claim 2.

Amended dependent claim 9 recites "the conductive polymer comprises a material selected from the group consisting of a carbon film and a metal filled silicone." Antecedent basis is provided on page 14, lines 1-2 of the specification. As with claim 2, Fjelstad et al. does not teach these materials for the contacts.

Amended independent claim 12 recites "each lead comprising a conductive polymer outer layer", and is allowable for the essentially the same reasons as claim 2.

Amended dependent claim 17 recites "the conductive polymer comprises a material selected from the group consisting of carbon and silicone", and is allowable for essentially the same reason as claim 9.

Amended independent claim 25 recites "each lead comprising an outer layer selected to provide a non-bonding

surface for the bumped contact", and is allowable for essentially the same reasons as claim 1.

Amended independent claim 31 recites "each lead comprising a conductive polymer outer layer", and is allowable for essentially the same reasons as claim 2.

Amended dependent claim 32 recites "the conductive polymer comprises a material selected from the group consisting of carbon and silicone", and is allowable for essentially the same reasons as claim 9.

CONCLUSION

In view of the above arguments and amendments, favorable consideration and allowance of claims 1, 2, 5-12, 17, 18, 25-27 and 31-32 is requested.

In addition, an Information Disclosure Statement is being filed concurrently with this Amendment. Should any issues remain, the Examiner is asked to contact the undersigned by telephone.

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